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ABSTRACT

This study analyzes the differential antecedents and consequences of high school curriculum placement, using longitudinal survey data from a subsample of a national sample of students who were contacted in the 9th, 11th, and 12th grades. The study focuses in particular on three general questions: 1) What are the mechanisms by which socioeconomic background affects curriculum placement? 2) When preenrollment controls are included, what effect does curriculum placement have on high school achievements (absolute and relative), goals, and behaviors? 3) How severely biased are estimates of curriculum effects when preenrollment motivations and achievements are not controlled? Analysis of the data show that students' socioeconomic characteristics influence high school curriculum placement almost totally through their effects on achievement, goals, and encouragement during junior high school. Also, curriculum placement has important effects on educational outcomes in the junior and senior years, even when preenrollment variables are controlled. (Author/JG)

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CURRICULUM TRACKING AND EDUCATIONAL STRATIFICATION: SOME FURTHER EVIDENCE

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Some Further Evidence

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Policy Studies in School Desegregation program applies the basic theories of social organization of schools to study the internal conditions of desegregated schools, the feasibility of alternative desegregation policies, and the interrelation of school desegregation with other equity issues such as housing and job desegregation. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Process and Career Development Program, extends the program's examination of the effects of curriculum placement on educational attainment.

Abstract

Utilizing longitudinal survey data from a subsample of a national sample of youth contacted in the 9th, 11th, and 12th grades, an elaborated "school process" model is evaluated to determine the differential antecedents and consequences of high-school curriculum placement. The effects of curriculum differentiation on academic achievements (both relative and absolute), educational goals, two behaviors relating to educational goals (application to and acceptance by a college), and social supports for educational attainment are considered. Pre-curriculum controls at the junior high level on these outcomes provide a stringent assessment of tracking effects not available in prior research. Socio-economic characteristics of students influence curriculum enrollment in high school almost totally through their effects on achievements, goals, and encouragement during junior high school. Net of numerous pre-enrollment control variables, curriculum placement has important effects on educational outcomes in the junior and senior years, serving both to mediate the effects of prior variables in the model and to contribute uniquely to the explanation of these outcomes. Curriculum assignments and consequences revealed in the analysis are interpreted in light of "functional" vs. "conflict" theories of educational stratification, and it is concluded that neither provides an entirely adequate explanation of such differentiation.

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Curriculum Tracking and Educational Stratification

In his 1976 Presidential address before the Southern Sociological Society, Alan Kerckhoff (1976) offered a critical appraisal of recent status attainment research. He quite correctly observed that this literature, especially the so-called "school process" modeling, generally has neglected organizational and structural arrangements which may constrain educational opportunities and outcomes. This imbalance reflects the enduring influence of the initial "Wisconsin" social-psychological models of educational stratification (Sewell, Haller, and Ohlendorf, 1970; Sewell, Haller, and Portes, 1969). In attempting to understand how status origins affect educational and socioeconomic attainments, these studies focused on mechanisms of socialization and on their importance in shaping students' motivations and values.

As a complement to the social-psychological perspective of the Wisconsin framework, Kerckhoff advocates consideration of structural constraints in the social organization of schooling which may condition educational outcomes entirely independently of the kinds of interpersonal and subjective processes so important to the Wisconsin model. The few studies to have included selection and allocation mechanisms in such models (e.g., Alexander and Eckland, 1975; Alexander and McDill, 1976; Heyns, 1974; Hauser, Sewell, and Alwin, 1976; Rosenbaum, 1975) buttress Kerckhoff's position. These studies all have focused on curriculum differentiation, examining how track membership provides access to various educational resources and promotes or retards achievement. Whether one is enrolled in a college or a non-college track has been found to be of considerable consequence across a broad range of outcomes, including academic performance, encouragement from significant others, educational goals, and self-conceptions of competence.

The study by Alexander and McDill (1976) is the most recent and comprehensive of these inquiries. Since the present paper builds upon their effort

in several respects, we first briefly review their findings and then develop the ways in which this report extends and refines their work.

Alexander and McDill considered the importance of selected social background and demographic characteristics for enrollment in a college-preparatory program and the consequences of such enrollment for a number of important educational outcomes. In terms of curriculum sorting, perhaps their most interesting finding was the substantial influence of status origins, which was almost as important as measured ability in determining track placement. Curriculum membership itself was found to exert appreciable influence on all subsequent outcomes, serving both to mediate the effects of background characteristics and to contribute uniquely to their determination. Finally, the importance of track placement for subjective outcomes was partly indirect, raising educational plans and self-esteem largely through its more immediate effects on the likelihood of associating with high status, high ability, and college-oriented peers and by either enhancing or depressing academic performance. Curriculum differentiation thus was identified as contributing to the maintenance of status advantages and disadvantages through the educational system by transmitting much of the influence of status origins upon a broad range of schooling outcomes.

These conclusions, while suggestive and potentially quite important, nevertheless are both incomplete and tentative. Their incompleteness refers to substantive issues not resolved by their analyses. Their tentativeness derives from data limitations, shared by all of the curriculum effects studies cited above, which might exaggerate the apparent importance of track placement.

With regard to data limitations, Alexander and McDill lacked precurriculum enrollment controls for their various school process outcomes. Under such circumstances, the interpretation of "curriculum effects" as such must be advanced with caution. Simply put, the possibility that students enrolled in, say, a college preparatory program were advantaged initially on any particular

outcome, rather than that advantage deriving from such enrollment and attendant educational experiences, cannot be rejected. Obviously, the "selection and allocation" interpretation of curriculum effects on plans, achievement, or any other educational outcome would be more secure were pre-enrollment levels of that outcome controlled. Lacking such longitudinal data, none of the curriculum effects research available to date has attempted such a stringent evaluation, which is one of the intentions of the present project. In so doing, we also will calculate the degree of upward bias in curriculum parameters estimated in the absence of such controls.

Assuming, as we do, that curriculum placement remains an important constraint upon educational attainment even after more adequate evaluation, many important substantive issues remain to be addressed. While much of the available literature has concentrated on the consequences of track membership, little has been learned of the mechanisms of curriculum sorting beyond the documentation of important social background and demographic differences in track placement. This neglect of allocative processes is particularly unfortunate in view of the apparent advantage of high status youth in achieving entree to college preparatory programs (Alexander and Eckland, 1975; Alexander and McDill, 1976). The present effort should help clarify the mechanisms by which high status origins actually promote college track placement. The direct transmission of status advantages will be distinguished from that deriving from status differences in socialization patterns and academic performance.

The present research also considers a more inclusive set of educational outcomes than have prior studies. Our models include as outcomes not only educational goals, academic achievement, and the social supports provided by significant others, but also whether the respondent has applied to college and, having applied, been accepted.

Goals of college attendance do not, in themselves, lead to college enrollment; indeed, no secondary school achievements nor background characteristics will secure a college education unless application for such is made. Knowledge of the common and unique determinants of both goals and goal-oriented behaviors will contribute to a better understanding of why some youth successfully negotiate the transition from high school to college, while others, perhaps equally motivated, do not.

THEORETICAL AND ANALYTICAL MODEL

Figure 1 presents the model guiding the present analyses. The model is fully recursive between blocks; variables within blocks do not affect one another directly, but are permitted to have correlated structural disturbances. Ordinary least squares regression procedures are used to estimate the structural parameters.

Figure 1 About Here

The specification of the model deserves brief comment. Socioeconomic background characteristics and the ascribed traits of race and sex are exogenous. Following common practice, ability is considered endogenous to these background characteristics. This specification permits estimation of the total effects of SES background and demographic characteristics upon achievement, curriculum placement, and other outcomes through reduced form equations and provides upperbound estimates of possible background influence upon measured ability. This positioning of ability will not affect estimates of its total effects upon the later outcomes.

A block of variables measured in the ninth grade, in junior high school, appears next, intervening between the exogenous and ability measures and the student's senior high school curriculum enrollment. Inclusion of these variables measuring previous academic achievement, motivations, and social supports will serve to secure more accurate estimates of the unique contribution of curriculum enrollment to senior high school outcomes, improving upon the model specifications

employed in previous studies of curriculum effects. Additionally, we expect that these mechanisms will mediate much of the SES effects on curriculum enrollment, as well as increase our ability to predict enrollment in a college preparatory track.

Senior high school curriculum enrollment, although ascertained in 1967, has been placed causally prior to other 1967 outcomes. The 1967 data were collected in the eleventh grade, after most curriculum assignments had been made -- usually in the tenth grade. We thus assume that curriculum placement may mediate influences of all prior variables upon all later outcomes.[1] Prior encouragements and achievements should influence track placement; curriculum membership should, in turn, affect later achievements as well as the likelihood of associating with college-oriented peers (Parsons, 1959). Finally, the labelling of students as either college-bound or not should temper the encouragement received from parents and others for pursuit of post-secondary education.

Standardized test scores, educational expectations, and senior class rank all have been examined in earlier research, and are included in this inquiry as well. The remaining two outcomes are behaviors directly related to the probability of post-secondary education. Application to college is generally necessary in order to attend college, and acceptance by an institution of higher education is a prerequisite. Table 1 documents the fact that a much larger proportion of seniors express college goals (63%) than have been accepted for college (19%), or even applied to a college (45%) as of January and February of their senior year. The extent of such discrepancies between expressed intentions and the behaviors necessary for their implementation suggests the importance of understanding the determinants of these goal-oriented behaviors.

SAMPLE

The sample is a subset of the cohort of students in the Academic Growth Study (Educational Testing Service, Princeton, New Jersey) who were contacted

in the fall of 1965 while they were in the ninth grade, and recontacted in the fall of the eleventh (1967) and winter (January and February) of the twelfth grades in high school. In the ninth and eleventh grades students were administered SCAT (School and College Ability Tests; see ETS, 1957a) verbal and quantitative batteries, six STEP tests (Sequential Tests of Educational Progress; see ETS, 1957b) and an attitude questionnaire. In the senior year the students completed a brief questionnaire largely concerned with post-secondary school plans, and were administered the PSAT verbal and quantitative battery. The 1607 students who form the sample for the present analyses are those who were enrolled in comprehensive (as opposed to vocational) high schools and for whom complete data were available on all variables of interest. They are enrolled in eight high schools in three large school districts across the United States; approximately 14 percent of the sample is Black and approximately 55 percent is female.[2]

VARIABLES

Background data on father's education and occupation, mother's education, and dwelling unit size were obtained from the 1965 and 1967 questionnaires. The 1967 responses were given priority due to minor coding irregularities in 1965; if 1967 responses were not available, however, 1965 responses were used.[3] An ability measure--the total SCAT score in 1965 -- and sex and race information also are included. The latter two variables were ascertained from school records and from counselors or yearbooks, respectively.

Pre-curriculum enrollment (i.e., ninth grade) controls were obtained from the 1965 questionnaire. These included curriculum plans (dichotomized as academic/other),[4] peers' educational plans (percent of friends planning to go to college, with values of 10, 30, 50, 70, 90% permissible), degree of maternal and paternal encouragement to go to college (with the five original Likert-type

response options being assigned values corresponding to the percentages available for the peers' plans measure), and educational expectations (dichotomized as college/other). The total STEP battery score from the ninth grade was included as a measure of academic achievement.

Senior High School data on intervening and outcome variables were obtained during the junior and senior years. Peers' educational plans, and paternal and materal encouragement for college were obtained from the 1967 eleventh grade questionnaire. Curriculum enrollment was taken from school records when possible; where these data were unavailable, the student's report of his/her curriculum enrollment from the questionnaire was employed.[5] The eleventh grade total STEP score is employed as an academic achievement measure. Other outcome variables are the student's educational plans in the senior year and information on whether the student had applied to and, if so, then been accepted by a college, all obtained from the senior questionnaire. The PSAT (Preliminary Scholastic Aptitude Test) or SAT verbal and quantitative tests were administered by the ETS staff (PSAT) or obtained from school records (SAT). These testing data tap academic achievement at the end of high school. PSAT scores were multiplied by 10 to place them on the same metric as the SAT, the latter scores being employed where available.[6] Senior class rank, an indicator of relative achievement, was obtained from school records. The means, standard deviations and metric information for all variables are presented in Table 1.

Table 1 About Here

ANALYSIS AND DISCUSSION

Our discussion will be organized around three general questions: (1) What are the mechanisms by which socioeconomic background affects curriculum placement; (2) What effect does curriculum placement have upon senior high school achievements (absolute and relative), goals, and behaviors designed to

implement these goals when pre-enrollment controls are included; (3) How severely biased are estimates of curriculum effects when pre-enrollment motivations and achievements are not controlled? Following precedent (Alexander and McDill, 1976; Heyns, 1974; Hauser, et al., 1976), we conduct our analysis on a matrix of within-school variances and covariances. This procedure eliminates from the data matrix systematic differences from school-to-school, thus focusing on selection and allocation processes within schools.[7]

Our results are presented in a series of tables organized around the major stages of the model depicted in Figure 1: Table 2 focuses on determinants of curriculum placement, with its terminal outcome being senior high school track membership; Table 3 extends the framework to consider other eleventh grade outcomes, including academic achievement and social supports for college; Table 4 contains parameter estimates for the final stage of the model, senior year attainments. Throughout we employ the strategy of successive reduced-form equation estimation recommended by Alwin and Hauser (1975) for calculating the total, direct, and, through simple subtraction, indirect effects implicit in recursive models.

The SES-Curriculum Linkage

Only moderate proportions of variance in pre-enrollment motivations and social supports are accounted for by background characteristics and ninth grade ability. Curriculum plans (24% explained variance) and Peer Plans (17% explained variance) are the most predictable of these early school process variables. In the structural equations, ability generally dwarfs the effects of socioeconomic factors and uniquely explains from 2 to 3 percent additional variance in the parental encouragement outcomes, 7 or 8 percent for educational goals and peers' plans, and 16 percent for curriculum plans.[8] Females are disadvantaged relative to males with regard to all outcomes except achievement

and especially are lacking in parental and peer support for post-secondary schooling. Blacks, on the other hand, receive somewhat more maternal encouragement and have higher expectations (including plans for enrollment in a college track) once ability is controlled; these effects are, however, quite modest (see also Debord, Griffin and Clark, 1977; Hout and Morgan, 1975; Kerckhoff and Campbell, 1977; Portes and Wilson, 1976).

Table 2 about here

In the reduced form equation, all SES and demographic variables (with the exception of the acquisition index) are significant determinants of track placement, with sex being the most important of these (although the aggregated SES effect, at .263 [not reported in tables], is larger yet). The inclusion of ability generally reduces, but does not exhaust, these direct effects. The blocked SES effect, for example, drops to .163 after measured ability is added. When controls for junior high school motivations and social supports are added to the equation, these exogenous influences are reduced still further, generally to the point of substantive triviality. Even the aggregated SES effect is quite small, at .091. Thus, almost two-thirds of the influence of socioeconomic origins on track placement is accounted for by the various pre-curriculum school process variables considered here -- academic ability and achievement, educational goals and curriculum plans and the social supports provided by parents and friends. The only background characteristic whose importance is largely independent of these intervening mechanisms is sex, whose structural coefficient remains two-thirds the size of its reduced form counterpart (Alexander and Eckland, 1974, similarly found little transmission of sex differences through such mechanisms). Even the substantial influence of ninth grade ability on eleventh grade curriculum placement is largely mediated through these intervening mechanisms, with total and direct effects of .458 and .151 respectively. Moreover, these pre-enrollment school process influences

contribute uniquely to the prediction of track membership, as evidenced by the increment in R^2 from .280 to .380 upon their addition to the curriculum equation. In the final (structural) equation ability, achievement, and ninth grade curriculum plans are identified as the major direct determinants of enrollment in a college track. In contrast, the direct effects of all status background indicators and race are negligible.

These results suggest that we have indeed identified some of the important linkages by which high status origins enhance one's prospects for enrollment in a college track (or, conversely, by which low status origins impede such prospects). High status youth benefit from a succession of modest advantages over the course of their early school careers. These, in the aggregate, practically exhaust the relevance of status origins for curriculum placement. By the time of entry into secondary school, higher status students already express somewhat higher levels of educational expectations and plans to pursue an academic program of study,[9] are more involved in peer networks supportive of academic pursuits and receive more parental support for college plans than their lower status, even equally able lower status, classmates. These, then, are the more proximate determinants of track placement and high status youth are somewhat advantaged on each of them. Other ascribed statuses, on the other hand, affect track placement quite differently. The primary reason for the lesser likelihood of blacks enrolling in a college track is their lower average test scores. With ability controlled, blacks actually are somewhat more likely to enroll in an academic program. Thomas, Alexander and Eckland (1977) report a similar finding for a larger, nationally representative sample of high school students. Finally, the disadvantage experienced by women with regard to the likelihood of enrolling in a college track is largely independent of all of these mechanisms.

Curriculum Effects on Eleventh Grade Outcomes

Table 3 presents the results for eleventh grade outcomes. In Table 3 (and

Table 4, which follows) we are concerned mainly with establishing the extent to which curriculum placement conditions access to various educational resources and either enhances or retards academic achievements. To simplify the presentation somewhat, we disregard the causal relations among pre-curriculum variables and treat them all as predetermined relative to curriculum placement and subsequent outcomes.

Table 3 About Here

The curriculum effects in Table 3 are pervasive, but modest throughout. College track placement enhances eleventh grade achievement even when ability and ninth grade achievement are controlled. The gain on the combined STEP score is about one fourth (28 percent) of a within-school standard deviation. Other influences on achievement are largely as anticipated, with measured ability and prior achievement having the only other appreciable effects (even the aggregated total effect of SES background is trivial, at .038).

Each of the structural equations for parental and peer support for post-secondary schooling exhibits a similar pattern of influences. Having had college-oriented friends in the ninth grade is the principal determinant of the corresponding eleventh grade associations, while curriculum and prior achievements have secondary, and about equal, implications for such peer relations. Parents' encouragement of their children's aspirations for college also is responsive to track placement (or, at least, students in academic tracks are likely to perceive such encouragement). In the structural equations for parental encouragement, curriculum placement has the second strongest effect, second only to the corresponding ninth grade parental encouragements. All other <u>direct</u> effects in the three equations are negligible (even the blocked SES effects range from only .074 to .116). For all interpersonal outcomes, the importance of curriculum placement is largely in transmiting prior influences, but it also <u>uniquely</u> induces an additional two to three percent explained variance. These strike us as rather impressive figures in view of the extensive controls on prior achievements, abilities,

and motivations in these equations.

SENIOR YEAR OUTCOMES

Table 4 presents the last portion of the model, which involves a broad range of senior year outcomes -- verbal and quantitative standardized test scores, senior class rank, educational goals, whether the student had applied to college and whether he/she had been admitted.

Table 4 About Here

Curriculum placement contributes little to verbal achievement in the senior year -- either before or after the inclusion of eleventh grade outcomes. In the structural equation for the verbal P/SAT, eleventh grade achievement, ninth grade achievement, and ability are the major direct determinants, in that order. In the structural equation for math performance, on the other hand, track placement is of some importance in addition to prior achievements and aptitudes -- being in a college track is worth about 26% of an overall and 27% of a pooled within-school standard deviation on the P/SAT quantitative battery. These differences in the determinants of verbal and quantitative performance might suggest that math achievement benefits from specialized course enrollment more so than does verbal performance.[10]

Although college preparatory work generally enhances students' absolute achievements during senior high school, it has virtually no effect on a relative measure -- class rank. Thus, these data suggest that higher grades, and thus higher class rank, are not disproportionately allocated to students in academic tracks over and above what might be expected from their somewhat higher abilities and achievements vis-a-vis non-college preparatory track students. The distribution of grades within each broad curriculum thus appears to allow excellence as well as failure to be accorded for mastery, or lack thereof, of program-specific subject matter. These findings are somewhat at variance with previous

results (Alexander and McDill, 1976), suggesting the need for detailed data on the administrative practices that govern relative achievement. Such practices might include differential weighting of grades in college versus non-academic tracks, extra credit being given for accelerated or advanced placement courses, and the like (see footnote 7). Finally, females, on the average, rank about 5 percentage points above men. Obviously, we cannot ascertain from these data whether "femaleness" in this context reflects better study habits, more diligence regarding completion of homework assignments, less disruptive classroom behavior -- in short, closer approximation to the ideal student prototype once ability and achievement levels are controlled -- or whether it represents only the teachers' presumption that young women try harder and are more cooperative than males (see Boocock, 1972, for a discussion of this issue).

Track placement appears to have especially marked consequences for goal-orientations. Knowledge of a student's curriculum membership uniquely explains about eight percent of the variance in senior year educational goals even after controlling for prior (ninth grade) goals. In fact, its structural effect is just under twice that of these earlier expectations and its addition to the prediction equation reduces to triviality the direct impact of exogenous variables (other than race), ability, ninth grade achievement and curriculum goals, and earlier social supports for college attendance. When later, eleventh grade, controls are added, the direct effect of curriculum is only slightly reduced, remaining by far the most important direct determinant of educational goals. Enrollment in a college preparatory track increases by about 30 percent the probability that students will plan in their senior year to continue their education in comparison to equally able, motivated, and encouraged youth in non-academic programs. Prior goals, eleventh grade achievements, status origins, and peer supports also impact moderately on expectations.

In view of the extensive controls in the structural equation, this direct impact of curriculum on educational goals is, to us, especially noteworthy. However, interpretation of these effects is not unambiguous. Many students in college-preparatory tracks may express college intentions merely because they have been chosen and labelled by their high schools as having college potential. This "halo" need not motivate behaviors designed to secure further education, and thus may be rather unimportant in transmitting status advantages to these individuals as adults. In other instances college orientations might reflect the fact that students in academic programs have been disproportionately counselled and encouraged to apply to college by teachers, counsellors, and parents and as a result have done so (Heyns, 1974); thus, the fact that college track membership encourages motivating aspirations is an important product of curriculum differentiation and allocation. In still other circumstances, these "educational plans" may only reflect certain knowledge of prior acceptance by a college, and thus may have little motivational relevance (Kerckhoff, 1976). Curriculum allocation in this instance might merely affect the initial mechanics of college application, rather than structure ambition. In short, interpretation of the impact of track segregation upon educational "goals" would differ decidedly depending upon which of these various alternatives actually obtained.

In the prediction of application to college, the addition of track membership to the equation containing background and pre-enrollment controls increases the coefficient of determination four percent. Curriculum is identified as the major direct determinant of the likelihood of so applying, substantially reducing the direct contributions of ability and junior high school achievements. As before with educational goals, the inclusion of controls for eleventh grade supports and achievements reduces only slightly the salience of an academic curriculum for college application. Realizing the importance of the application

procedure for continuing one's education beyond high school, these results are quite relevant to adult attainment and indicate the fruitfulness of a structural view of adolescent attainment. Enrollment in a college-preparatory program markedly increases the likelihood -- by about 22 percent as suggested by these data -- of applying to college over what would be expected for students similar in all other respects save their enrollment in a non-academic track.

Within the confines of our model, the role of academic track membership in securing admission to a college is similar to its role in formulating college orientations and attempts to secure college acceptance. It uniquely contributes to explained variation (two percent) and mediates prior influences. Again, it remains clearly the most important direct determinant of the senior year outcome -- in the structural equation in which controls are included for background, ability, and both pre- and post-enrollment achievements and social supports, membership in an academic program in high school increases by .13 the probability of being accepted by a college. Other direct influences, although statistically significant, are substantively trivial. This holds even for the aggregated effects of SES, with total and direct effects of .094 and .073, respectively.

Expectations to attend, application to, and acceptance by a college are by no means equivalent. As noted earlier, 63 percent of these students express college goals, 43 percent have applied to and only 19 percent have been accepted by a college. A comparison of the raw coefficients for the impact of curriculum placement in the structural equations for these three outcomes reveals an inverse relationship between the impact of academic track membership and the concreteness of the outcome. "Plans" to attend college, perhaps totally ungrounded aspiration, are enhanced most by academic track placement; the taking of steps to secure admission to a college next so, and actual acceptance by a college least. The overall predictability of these outcomes from our model also is

related inversely to the probability of attending college: we can predict 40 percent of the variance for college plans, 34 percent for application to and 16 percent for acceptance by a college.

It should also be noted, however, that estimates of the direct effects of curriculum presented here -- certainly in the case of ADMITED and possibly in the case of APPLIED -- likely are somewhat upwardly biased due to misspecification of the relationships among these endogenous variables. The causal relationships between goals, application, and acceptance are not immediately apparent due to their simultaneous measurement late in the senior year of high school. The exact nature of plans for further education are, in this model (as in most such research), undetermined. They might reflect vague aspirations, motivating influences, or concrete knowledge of prior acceptance by college. In short, causality potentially will vary across different subsamples of students depending upon the amount of information available to them regarding their actual likelihood of attendance. Further effort to disentangle the relationships among these three outcomes would be tangential to our major interests and will not be pursued here, although an effort to do so is in progress (Cook and Alexander, N.D.).

THE IMPORTANCE OF PRE-CURRICULUM CONTROLS

The pre-enrollment (i.e., junior high school) controls are generally, with the exception of ninth grade achievement, rather poorly predicted by our model, suggesting that extensive and perhaps novel elaboration of the traditional school process framework would be required to do better. Nevertheless, these outcomes themselves do contribute to our understanding of how curriculum placement affects adolescent achievement. Pre-curriculum enrollment controls for achievement, motivations, and social supports generally serve several functions. As noted earlier, they mediate almost all of the effects of exogenous SES variables

on curriculum enrollment, as well as absolutely increase by 10 percent the explained variance in enrollment in a college track. They also mediate prior influences and, more importantly, induce substantial unique variability in senior high school outcomes subsequent to curriculum enrollment relative to that obtained when background and ability alone are used to explain these outcomes. A further reason for concerning ourselves with junior high school outcomes is documented in Table 5: when these controls are not included in the prediction equation for senior high school outcomes, the total effects of curriculum enrollment are markedly overestimated as compared to the criterion estimates in the correctly specified model (see lines A to C, Table 5). These pre-enrollment controls generally attenuate estimates of curriculum influence from twenty to fifty percent. While such reductions are considerable and suggest the need for caution in accepting uncritically the results of similarly misspecified models, this quite stringent evaluation still reveals the consequences of track placement to be pervasive and frequently substantial. Thus, while earlier inquiries may have exaggerated the precise magnitude of tracking influences, their interest in selective and allocative mechanisms as constraints on adolescent achievement has not been misplaced.

Table 5 About Here

SUMMARY AND DISCUSSION

Our analyses address many of the issues raised but not resolved in earlier research on high school tracking. Our results suggest that the socioeconomic characteristics of students do affect their curriculum enrollment but do so almost exclusively through their influence upon achievements, goals, and encouragements by others in junior high school. Although these junior high school outcomes are poorly predicted from the background characteristics included

in our model, they nevertheless are of considerable consequence: they mediate prior influences; are quite important for senior high school curriculum placement; and predict later encouragements and goals better than any other variables included in the analysis.

Even with pre-enrollment controls, however, the importance of curriculum placement for junior year and senior year outcomes is marked. In particular, tracking consistently affects educational goals, achievements, and goal-oriented behaviors in the twelfth grade, often being the most important factor of those included in our model. Being in a college track increases the probability of applying to college and enhances one's prospects for being admitted. In these ways, sorting processes within high school may substantially affect later socioeconomic attainments.

Two counterposed perspectives may be identified in the sociological and educational literatures, and in popular thought, concerning the proper role of curriculum differentiation in high school education. The first maintains that resources should be allocated where they can achieve maximum returns (Parsons, 1959). More able students who have, in elementary and junior high school, demonstrated high achievement levels and are motivated to pursue higher education should be provided access to an academically oriented, enriched high school learning environment. Students of lesser ability and past performance, often despite desires for a college education, are properly channeled into general or vocational tracks. Thus, the argument goes, each group of students can be taught at a level appropriate to its potential. College-bound students are challenged, stretched (Rosenbaum, 1975), and generally encouraged to achieve to their potential (Cicourel and Kitsuse, 1963). They benefit from (1) the more advanced material to which they are exposed, (2) the faster pace at which they can progress by being insulated from their less able peers, (3) the comforting knowledge that they are, indeed, college material, and (4) the

atmosphere of encouragement from equally able peers, interested teachers and counsellors (Heyns, 1974). Students who are judged, according to ability, past performance, interests and motivation, to be incapable of performing college work likewise benefit from their assignment to a non-college program of study with their equals: (1) material is presented to them which is relevant to their likely future adult circumstances; (2) their self-concept does not suffer from failure in competition with much more academically able students (see Coleman et. al., 1966); and (3) material is presented at a pace consistent with their ability to absorb it. Curriculum differentiation therefore allocates scarce resources in a manner beneficial to all concerned, including the collective welfare of the larger social system.

Others, critics of tracking as it is presently practiced, suggest that tracking channels scarce resources to those who have the least need for them. Students in non-college tracks are denied access to students, teachers, counselors, and information which would broaden their interests, challenge their abilities (Rosenbaum, 1975), and improve their performance (Heyns, 1974; Cicourel and Kitsuse, 1963). They are discouraged from competition with initially more advantaged students and hence are not required, or even encouraged, to strive for academic excellence. They are looked down upon by persons in academic tracks as being somewhat stupid, suffer from feelings of inferiority, and fail to develop attitudes and insights concerning education and institutional functioning which would allow them to compete successfully with their more advantaged classmates for post-schooling resources and rewards (Gintis, 1971; Bowles and Gintis, 1976). Moreover, they are shunted into curricula which will impede their prospects for success in college should they persevere in their college aspirations (Ramsøy, 1965) and more likely will be relegated to junior and community colleges, further "cooling out" their ambition (Clark, 1960;

Karabel, 1972). They are, thereby, while still adolescents, subjected to social forces beyond their control, or at least whose implications they cannot fully appreciate, which may limit in important ways their prospects for adult success. Thus, curriculum differentiation benefits the advantaged and discriminates against those most in need of additional resources, especially serving the interests of higher status parents who exploit such mechanisms to legitimate and perpetuate their children's success. As the above suggests, the literature critical of current school organization typically develops two closely linked, but separable, themes. One emphasizes socioeconomic biases in educational policies and practices; the second involves the preference given intellectually advantaged, rather than deprived, youth.

Our data actually are somewhat supportive of the positions taken by both proponents and critics of tracking. The major determinants of curriculum assignment <u>are</u> ability, junior high school achievement, and curriculum and educational aspirations in the ninth grade. However, over 60 percent of the variance in placement is left unexplained by these factors; thus, criteria other than objective ability and performance are quite important in the allocation of resources to students. Furthermore, the total effects of the background variables in our model on curriculum placement document the tendency for higher status students to be streamed disproportionately into college preparatory curricula and hence to receive its attendant benefits.

Placement in a college track <u>does</u> enhance achievements, goals, and social supports in senior high school and markedly increases the probability of application to and acceptance by a college. Thus, the advantages accruing to such students are cumulative. Their favored backgrounds and early academic achievements increase the likelihood of enrollment in a college track, which

accrues additional, wide-ranging educational benefits. Conversely, students in non-academic tracks are, by virtue of such assignment, substantially disadvantaged in their future educational careers. While such students are recognized by both proponents and critics of tracking as being initially academically disadvantaged, the former think it most judicious that academic resources be directed elsewhere while the latter contend that efforts to close, rather than widen, the gap between high and low achievers should be given first priority (Rosenbaum, 1975).

If students were in fact assigned to curricula strictly on the basis of either "merit" (i.e., performance and ability) or ascriptive statuses (i.e., socioeconomic status, race, sex), then the consequences of these tracking influences would at least conform to one or the other of the scenarios outlined above. Actually, each is only in part correct, and the situation is even more complex than either perspective suggests. Clearly, the different curricula do independently affect the achievements of their members, improving those of academic students and depressing those of general and vocational track members. Under an efficient meritocracy, however, students of equivalent ability and performance would never be assigned to different curricula. Hence, no student's objective potential would be stifled and preference for such practices would depend on whether one thought that resources are best allocated to the most or to the least needy. However, there actually is considerable slippage in the process of curriculum sorting. Factors entirely unrelated to objectively assessed performance and potential are important determinants of track assignment, and, hence, markedly influence a student's subsequent academic career through the simple administrative act of track placement. Two students of equal ability, motivation and past performance can be, and often are, assigned to different curricula!

These data cannot resolve what is fundamentally a political and ideological question: whether benefiting the advantaged or the disadvantaged is the more proper use of public resources. It is clear, however, that achievement-related criteria are not the sole, or even major, bases of curriculum assignment. Students of similar potential often are, for as yet undetermined reasons, placed in different tracks, thereby expanding opportunities for one group and constricting them for the other. At the same time, direct socioeconomic ascription in track placement is almost negligible. Thus, to a considerable degree the benefits associated with enrollment in a college program are available entirely independent of status origins and academic achievement, suggesting that neither functional nor conflict theories adequately characterize the role of curriculum differentiation in educational and social stratification.

Differential tracking in secondary schools thus introduces academic inequalities where none previously existed, and in so doing contributes independently to educational and socioeconomic inequalities. Such unrecognized consequences of administrative practices might be thought undesirable and undeserved by proponents of each of the above perspectives on the social organization of schooling.

FOOTNOTES

1. The grade structure of most of the schools in our sample (10 through 12) also justifies this specification. Two of the eight high schools, however, have earlier entry levels, one in grade nine and one in grade seven, possibly invalidating our assumption that ninth grade measures are temporally, if not causally, prior to track placement. However, an analysis of covariance revealed few differences between these two schools and the other six. Knowledge of whether the student was enrolled in one of these two as opposed to any of the other six, together with all possible school interactions, added at most two percent explained variance over that obtained for the structural equations reported in the text. Also, our use of 1967 background data assumes that parental status characteristics are relatively stable over short periods of time (particularly during their childrens' adolescent years) and that later reports are likely more valid than earlier, 1965, ones.

2. Approximately 5600 students in 27 high schools in 17 communities took the senior questionnaire in 1969; this figure establishes an upper bound on the longitudinal sample size. Information on respondents' race, however, was collected in only 3 communities in 1967. After elimination of students without race information and non-participants in any wave of data acquisition, we retained about 2400 persons in 10 high schools. Two schools were omitted because they were vocational rather than comprehensive schools, leaving approximately 1900 students. The exclusion of students due to missing data on any particular items in our analyses reduced the sample to the final size of approximately 1600.

   Previous research (e.g., Porter, 1974; DeBord, Griffin, and Clark, 1977) has documented race interactions in social-psychological achievement models similar to the one estimated here. An analysis of covariance revealed generally negligible race and sex interactions in these data, thus permitting

our use of a pooled sample with race and sex dummy variables. The increase in R^2 resulting from the inclusion of race and sex interaction terms to the various equations of our model was, for most outcomes, approximately 2 percent (absolute). Contrary to other studies of race and sex differences, we have used pooled within-school variances and covariances in our analysis (see below in text and also footnote 7). The proportion of blacks varied across the eight schools in our sample as follows: .085; .091; .058; .399; 000; .008; .924; .058. Thus, when purging our data of all school-to-school differences we, in effect, removed the marked between-school differences in racial composition. The remaining individual level within-school race effects thus are unconfounded by school-to-school differences in racial composition, a possibly quite important difference between our approach and that employed in other research on race and sex differences.

3. For the 1607 cases the amount of data substitution for the four outcomes was: FAOCC 2.9%; MOED 1.6%; FAED 2.8%; ACQUIS .2%.

4. While the present project contrasts college preparatory enrollment with all other curricula, this crude classification may well mask important distinctions between non-academic tracks. Future research on secondary school tracking should consider this possibility, although we believe the college/non-college dichotomy reflects the major curriculum distinction insofar as issues of educational stratification are concerned.

5. The student's report was employed in 7.5% of the 1607 cases.

6. Only about 14% of the scores on this variable are from the SAT. The data available to us are EITHER PSAT OR SAT scores, the former having been recorded if the school could furnish that information, and the latter being recorded for all other students from the ETS testing session in the winter of the senior year. To render the scores compatible, PSAT scores were

multiplied by 10, an acceptable method for achieving this end (Julian Stanley, personal communication).

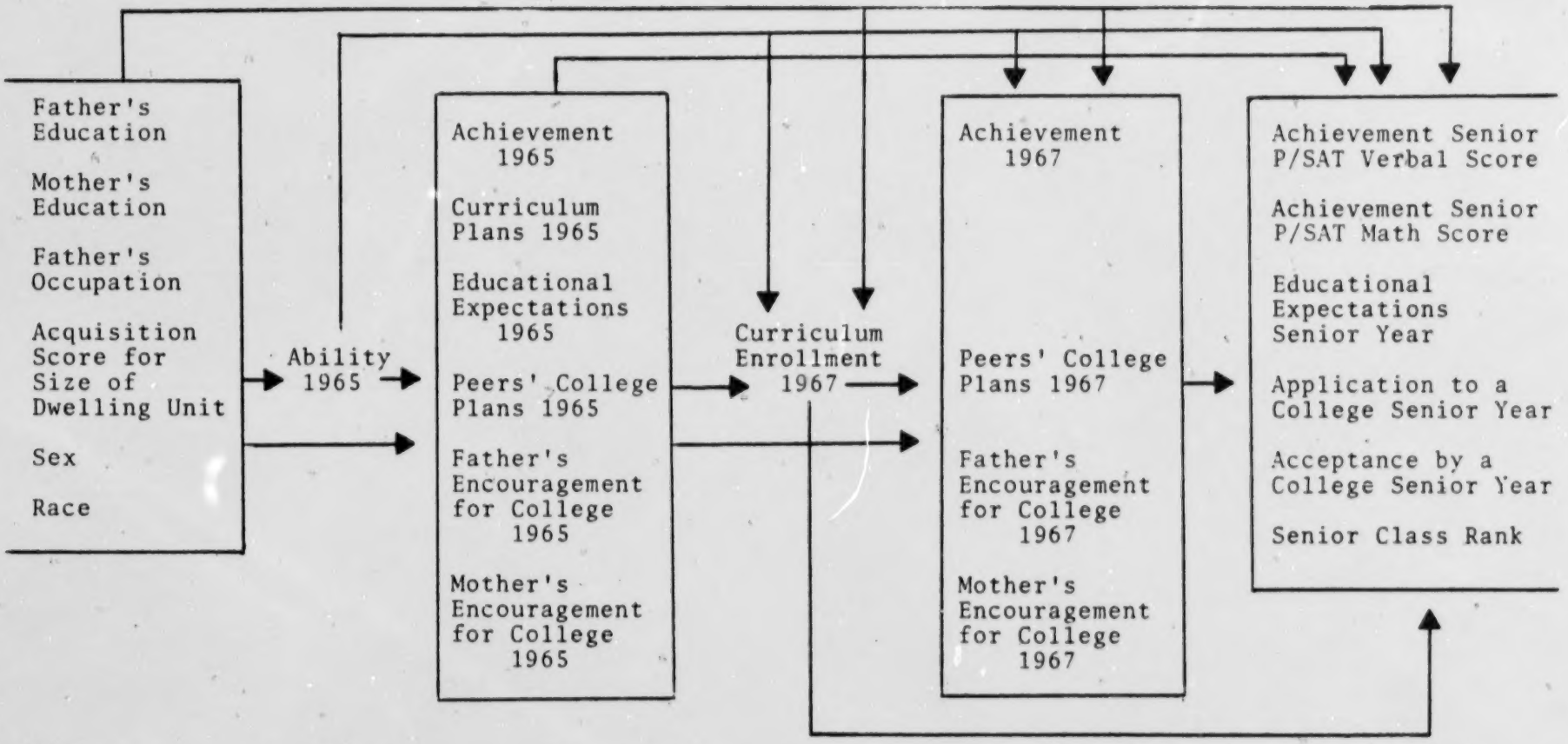
7. Allowing the slopes to vary across the eight schools increased the within-school explained variance an average of about 5% (absolute) per endogenous variable. The increment in R^2 was significant at .05 the level for 11 of the 18 outcomes in the structural model. In particular, the largest increments in explained variance were: 7% for EDEX-SR; 7% for APPLIED; 10% for ADMITED; and 9% for SRRANK. The increments for senior year outcomes resulted from the addition of 126 interaction terms to each of the structural equations. Comparisons of the within-school parameter estimates across the eight schools revealed no substantively meaningful patterns, although the specific determinants of each senior year outcome sometimes differed markedly from school to school. Furthermore, when increments in explained variance were computed from R^2's adjusted for the number of regressors in each equation the increments were essentially zero throughout.

8. Using a procedure devised by Heise (1972), we have calculated the aggregated effects of the four separate background indicators to facilitate comparison of "SES" influences with other variables in the model. The respective total and direct SES effects for the various pre-curriculum controls are: ACHV-9: .261, .049; CUPL-9: .262, .163; EDEX-9: .202, .139; PRPL-9: .265, .199; FAEN-9: .178, .144; MOEN-9: .132, .101. Thus, except for the three social support measures, the total effects of ability far exceed even the aggregated effects of the SES indicators and, throughout, ability accounts for much of the influence of status origins on later outcomes.

9. The notable effect of ninth-grade curriculum plans on subsequent enrollment suggests that there may be considerable voluntarism in tracking decisions. Thus, the contrast between "selection-allocation" perspectives and "socialization" models (Kerckhoff, 1976) probably should not be too sharply drawn

until more evidence is available on the bases of selection. Nevertheless, the consequences of decisions, once made, might be "allocative" in nature, regardless of the mechanics of the selection process.

10. There is, in fact, some suggestive evidence regarding the greater responsiveness of mathematics achievement, as opposed to verbal achievement, to specialized curricula and coaching. See, for example, College Entrance Examination Board, (1968), McDill and Rigsby (1973, pp. 63-5), Shaycoft (1967).



*Variables are blocked for simplicity of presentation. The model is fully recursive; all prior variables directly affect all later ones. Variables within blocks are not assumed to be causally related; their structural disturbances are assumed to be correlated due to the omission of variables which would simultaneously affect all of them. See text for a brief justification of the temporal specification of the model, especially as concerning "curriculum placement."

Figure 1. Structural Model of Curriculum Placement Influences in the Adolescent Educational Attainment Process*

Table 1. Means, Standard Deviations, and Metric Information for Variables Employed in the Structural Model (N = 1607)

	Variable	Overall Mean	Overall Standard Deviation	Within-School Standard Deviation*	Metric Information
.	Father's Education	12.75	2.75	2.51	Years of Schooling
.	Mother's Education	12.52	2.30	2.15	Years of Schooling
Back-	Father's Occupation	41.58	20.54	19.08	Duncan SEI
ground	Acquisition Index	9.62	2.72	2.62	Number of Rooms + Baths
.	Sex	.55	.50	.50	Female=1; Male=0
.	Race	.14	.35	.27	Black=1; Non-Black=0
1965	Ability	284.14	11.53	10.79	SCAT Test Score (Total)
.	Achievement 1965	1671.28	76.65	71.57	STEP Test Score (Total)
.	Curriculum Plans	.53	.50	.49	Academic=1; Other=0
.	Educational Plans	.69	.46	.45	College=1; Other=0
1965	Peers' College Plans	59.73	28.92	27.15	Percent Planning College
.	Father's Encouragement	83.11	14.25	13.96	Percent of Encouragement
.	Mother's Encouragement	83.89	13.77	13.54	Percent of Encouragement
1967	Curriculum Placement	.60	.49	.47	Academic=1; Other=0
.	Achievement 1967	1719.45	76.59	72.50	STEP Test Score (Total)
.	Peers' College Plans	60.70	26.88	25.68	Percent Planning College
1967	Father's Encouragement	82.50	14.35	14.05	Percent of Encouragement
.	Mother's Encouragement	82.83	14.01	13.69	Percent of Encouragement
.	Educational Plans	.63	.48	.45	College=1; Other=0
.	Applied to College	.45	.50	.49	Yes=1; No=0
Senior	Accepted by College	.19	.39	.37	Yes=1; No=0
Year	Achievement-Verbal	403.77	116.44	111.94	PSAT/SAT Test Score (Total)
.	Achievement-Math	416.25	129.24	124.13	PSAT/SAT Test Score (Total)
.	Senior Class Rank	62.83	29.57	29.56	Percent of Class Below

*These are the pooled within-school standard deviations employed in the analyses.

Table 2. Parameter Estimates for the Reduced Form and Structural Equations in the Adolescent Attainment Model: Ability, Ninth Grade Outcomes, and Curriculum Placement **

Dependent Variables	Independent Variables													R^2
	FAED	MOED	FAOCC	ACQUIS	SEX	RACE	ABILITY	ACHV-9	CUPL-9	EDEX-9	PRPL-9	FAEN-9	MOEN-9	
ABILITY	(.497)	(.643)	(.041)	(-.227)	(-1.130)	(-9.864)								.154
	.116*	.128*	.072*	-.055*	-.052*	-.251*								
ACHV-9	(4.137)	(4.267)	(.202)	(-1.735)	(4.860)	(-50.807)								.128
	.145*	.128*	.054*	-.064*	.034	-.195*								
	(1.260)	(.541)	(-.034)	(-.419)	(11.406)	(6.315)	(5.791)							.772
	.044*	.016	-.009	-.015	.079*	.024	.873*							
CUPL-9	(.016)	(.025)	(.004)	(.001)	(-.078)	(-.087)								.084
	.084*	.110*	.138*	.004	-.079*	-.049*								
	(.007)	(.012)	(.003)	(.005)	(-.056)	(.105)	(.019)							.241
	.035	.054*	.107*	.028	-.057*	.059*	.431*							
EDEX-9	(.017)	(.015)	(.002)	(.002)	(-.090)	(.008)								.052
	.097*	.074*	.081*	.013	-.101*	.005								
	(.012)	(.008)	(.001)	(.005)	(-.077)	(.122)	(.011)							.117
	.065*	.038	.061*	.029	-.086*	.075*	.277*							
PRPL-9	(1.274)	(1.234)	(.163)	(.165)	(-6.065)	(-7.536)								.098
	.118*	.098*	.115*	.016	-.111*	-.076*								
	(.916)	(.769)	(.134)	(.329)	(-5.250)	(-.420)	(.721)							.168
	.085*	.061*	.094*	.032	-.096*	-.004	.287*							
FAEN-9	(.549)	(.159)	(.066)	(.034)	(-3.322)	(-.459)								.048
	.099*	.024	.091*	.006	-.118*	-.009								
	(.447)	(.027)	(.058)	(.081)	(-3.091)	(1.558)	(.204)							.069
	.080*	.004	.080*	.015	-.110*	.031	.158*							
MOEN-9	(.093)	(.449)	(.054)	(.044)	(-4.434)	(1.621)								.044
	.017	.071*	.076*	.009	-.163*	.033								
	(.003)	(.333)	(.047)	(.085)	(-4.230)	(3.395)	(.180)							.061
	.001	.053	.066*	.016	-.155*	.069*	.143*							
CURRIC	(.017)	(.028)	(.003)	(.007)	(-.143)	(-.088)								.102
	.089*	.130*	.104*	.037	-.151*	-.051*								
	(.007)	(.016)	(.002)	(.011)	(-.120)	(.109)	(.020)							.280
	.036	.071*	.071*	.063*	-.127*	.064*	.458*							
	(.000)	(.011)	(.001)	(.010)	(-.100)	(.064)	(.007)	(.001)	(.204)	(.111)	(.001)	(.002)	(-.000)	.380
	.002	.048*	.031	.053*	-.106*	.037	.151*	.179*	.212*	.106*	.069*	.073*	-.002	

*Coefficient greater than or equal to 1.96 times its standard error; standardized and raw (in parentheses) coefficients.

**FAED, Father's Education; MOED, Mother's Education; FAOCC, Father's Occupation; ACQUIS, Acquisition Index; ACHV-9, STEP Achievement in Ninth Grade; CUPL-9, Curriculum Plans in Ninth Grade; EDEX-9, Educational Expectations in Ninth Grade; PRPL-9, Peers' College Plans in Ninth Grade; FAEN-9, MOEN-9, Father's and Mother's Encouragement for College in Ninth Grade; CURRIC, Curriculum Placement; ACHV-11, STEP Achievement in Eleventh Grade; PRPL-11, Peers' College Plans in Eleventh Grade; FAEN-11, MOEN-11, Father's and Mother's Encouragement for College in Eleventh Grade; P/SAT-V, P/SAT-M, Verbal and Math Achievement Scores in Twelfth Grade; SRRANK, Senior Class Rank; EDEX-SR, Senior Educational Expectations; APPLIED, Application to College; ADMITED, Acceptance by a College.

Table 3. Parameter Estimates for the Reduced Form and Structural Equations in the Adolescent Attainment Model: Eleventh Grade Outcomes**

Dependent Variables	Independent Variables														R^2
	FAED	MOED	FAOCC	ACQUIS	SEX	RACE	ABILITY	ACHV-9	CUPL-9	EDEX-9	PRPL-9	FAEN-9	MOEN-9	CURRIC	
ACHV-11	(.316)	(.956)	(.011)	(.212)	(-6.346)	(-13.022)	(1.525)	(.625)	(8.037)	(.301)	(.061)	(-.008)	(-.031)		.781
	.011	.028*	.003	.008	-.044*	-.049*	.227*	.617*	.054*	.002	.023	-.002	-.006		
	(.309)	(.751)	(-.004)	(.026)	(-4.393)	(-14.268)	(1.397)	(.602)	(4.047)	(-1.871)	(.038)	(-.057)	(-.030)	(19 512)	.790
	.011	.022	-.001	.001	-.030*	-.054*	.208*	.595*	.027	-.012	.014	-.011	-.006	.126*	
PRPL-11	(.248)	(1.032)	(.046)	(.404)	(-5.507)	(1.098)	(.025)	(.075)	(1.767)	(3.644)	(.255)	(.108)	(.044)		.312
	.024	.086*	.034	.041	-.107*	.012	.010	.208*	.034	.063*	.270*	.059	.023		
	(.244)	(.932)	(.039)	(.314)	(-4.555)	(.491)	(-.038)	(.063)	(-.177)	(2.586)	(.244)	(.085)	(.045)	(9.507)	.331
	.024	.078*	.029	.032	-.088*	.005	-.016	.177*	-.003	.045	.258*	.046	.024	.174*	
FAEN-11	(.372)	(.060)	(.022)	(.164)	(-1.742)	(1.019)	(-.026)	(.009)	(1.764)	(2.178)	(-.016)	(.354)	(.059)		.240
	.066*	.009	.030	.031	-.062*	.020	-.020	.045	.061*	.069*	-.030	.352*	.057		
	(.370)	(.002)	(.018)	(.113)	(-1.201)	(.674)	(-.062)	(.003)	(.658)	(1.576)	(-.022)	(.341)	(.060)	(5.409)	.260
	.066*	.000	.024	.021	-.042	.013	-.047	.013	.023	.050	-.042	.339*	.058	.181*	
MOEN-11	(.207)	(.291)	(.015)	(.104)	(-3.119)	(2.625)	(-.048)	(.010)	(1.968)	(2.887)	(.009)	(.088)	(.297)		.260
	.038	.046	.020	.020	-.113*	.053*	-.038	.052	.070*	.094*	.017	.090*	.294*		
	(.205)	(.227)	(.010)	(.046)	(-2.506)	(2.234)	(-.088)	(.003)	(.714)	(2.204)	(.001)	(.073)	(.298)	(6.132)	.288
	.038	.036	.014	.009	-.091*	.045*	-.069	.015	.025	.072*	.003	.074*	.295*	.210*	

*Coefficient greater than or equal to 1.96 times its standard error; standardized and raw (in parentheses) coefficients.

**See Table 2 for variable abbreviations.

Table 4. Parameter Estimates for the Reduced Form and Structural Equations in the Adolescent Attainment Model: Twelfth Grade Outcomes**

Dependent Variables	Independent Variables																	R^2
	FAED	MOED	FAOCC	ACQUIS	SEX	RACE	ABILITY	ACHV-9	CUPL-9	EDEX-9	PRPL-9	FAEN-9	MOEN-9	CURRIC	ACHV-11	PRPL-11	FAEN-11	MOEN-11	
P/SAT-V	(1.577)	(1.144)	(.264)	(-.911)	(-5.433)	(11.991)	(2.781)	(.831)	(10.995)	(-5.126)	(.117)	(-.208)	(.037)						
	.035	.022	.045*	-.021	-.024	.029	.268*	.531*	.048*	-.020	.028	-.026	.005						.672
	(1.571)	(.973)	(.251)	(-1.065)	(-3.810)	(10.955)	(2.675)	(.812)	(7.679)	(-6.932)	(.097)	(-.248)	(.039)	(16.216)					
	.035	.019	.043*	-.025	-.017	.027	.258*	.519*	.033	-.028	.024	-.031	.005	.068					.675
	(1.282)	(.462)	(.249)	(-1.109)	(-.392)	(19.131)	(1.445)	(.441)	(4.946)	(-6.494)	(.076)	(-.279)	(-.015)	(2.112)	(.613)	(.002)	(.149)	(.213)	
	.029	.009	.042*	-.026	-.002	.047*	.178*	.282*	.022	-.026	.019	-.035	-.002	.009	.397*	.000	.019	.026	.710
P/SAT-M	(1.429)	(.639)	(-.029)	(1.288)	(-47.900)	(-18.284)	(4.442)	(.494)	(20.775)	(12.110)	(.252)	(-.099)	(-.386)						
	.029	.011	-.004	-.027	-.192*	-.040*	.386*	.285*	.082*	.044*	.055*	-.011	-.042						.601
	(1.411)	(.145)	(-.065)	(.841)	(-43.207)	(-21.276)	(4.135)	(.439)	(11.190)	(6.890)	(.196)	(-.215)	(-.382)	(46.876)					
	.029	.003	-.010	.018	-.173*	-.047*	.359*	.253*	.044*	.025	.043*	-.024	-.042	.177*					.621
	(1.155)	(-.415)	(-.071)	(.776)	(-39.589)	(-15.158)	(3.485)	(.135)	(8.953)	(6.689)	(.149)	(-.224)	(-.485)	(33.905)	(.492)	(.114)	(-.001)	(.376)	
	.023	-.007	-.011	.016	-.158*	-.034*	.303*	.078*	.035	.024	.033	-.025	-.053*	.128*	.287*	.024	-.000	.041	.640
SRRANK	(.334)	(.185)	(-.032)	(-.313)	(4.309)	(-2.893)	(.412)	(.090)	(-.495)	(3.400)	(.035)	(-.011)	(-.001)						
	.028	.013	-.021	-.028	.072*	-.027	.150*	.217*	-.008	.051	.032	-.005	-.000						.163
	(.333)	(.148)	(-.035)	(-.346)	(4.658)	(-3.116)	(.389)	(.085)	(-1.208)	(3.012)	(.031)	(-.019)	(-.001)	(3.486)					
	.028	.011	-.022	-.031	.078*	-.029	.142*	.207*	-.020	.045	.029	-.009	-.000	.055					.165
	(.265)	(.010)	(-.038)	(-.380)	(5.370)	(-1.246)	(.220)	(.008)	(-1.659)	(3.139)	(.009)	(-.043)	(.028)	(.590)	(.120)	(.078)	(.094)	(-.116)	
	.023	.001	-.024	-.034	.090*	-.012	.080	.020	-.027	.047	.009	-.020	.013	.009	.295*	.069*	.044	-.054	.189
EDEX-SR	(.009)	(.005)	(.001)	(-.001)	(-.083)	(.176)	(.005)	(.001)	(.087)	(.214)	(.002)	(.002)	(-.000)						
	.051	.026	.060*	-.007	-.091*	.106*	.129*	.090*	.094*	.211*	.112*	.066*	-.009						.298
	(.009)	(.002)	(.001)	(-.004)	(-.048)	(.153)	(.003)	(.000)	(.016)	(.176)	(.001)	(.001)	(-.000)	(.346)					
	.050*	.009	.049*	-.026	-.053*	.093*	.074	.026	.017	.173*	.087*	.039	-.008	.360*					.378
	(.007)	(-.001)	(.001)	(-.005)	(-.030)	(.158)	(.002)	(-.000)	(.012)	(.166)	(.001)	(.000)	(-.001)	(.295)	(.001)	(.002)	(.002)	(.001)	
	.040	-.004	.043	-.032	-.033	.096*	.059	-.062	.013	.163*	.057*	.011	-.024	.306*	.110*	.121*	.064*	.031	.399
APPLIED	(.019)	(.004)	(.001)	(.007)	(-.028)	(.116)	(.006)	(.001)	(.112)	(.146)	(.002)	(.001)	(-.000)						
	.098*	.017	.030	.038	-.029	.065*	.125*	.143*	.112*	.134*	.125*	.025	-.003						.283
	(.019)	(.001)	(.001)	(.005)	(-.001)	(.099)	(.004)	(.001)	(.057)	(.117)	(.002)	(.000)	(-.000)	(.265)					
	.097*	.005	.022	.025	-.001	.056*	.086	.097*	.058*	.107*	.107*	.006	-.002	.256*					.324
	(.017)	(-.001)	(.000)	(.004)	(.014)	(.107)	(.003)	(.000)	(.053)	(.109)	(.001)	(-.001)	(-.000)	(.218)	(.091)	(.002)	(.002)	(.000)	
	.089*	-.005	.017	.020	.014	.061*	.067	.009	.053*	.101*	.083*	-.020	-.009	.211*	.119*	.096*	.065*	.006	.339
ADMITED	(.001)	(.001)	(.002)	(.002)	(.001)	(.025)	(.002)	(.001)	(.043)	(.074)	(.001)	(-.000)	(.001)						
	.008	.003	.086*	.013	.001	.018	.048	.140*	.057	.089*	.094*	-.004	.035						.132
	(.001)	(-.001)	(.002)	(.000)	(.016)	(.015)	(.001)	(.001)	(.012)	(.057)	(.001)	(-.000)	(.001)	(.154)					
	.007	-.006	.080*	.003	.022	.011	.019	.106*	.016	.069*	.081*	-.018	.035	.194*					.155
	(.000)	(-.002)	(.001)	(-.000)	(.025)	(.014)	(.001)	(.000)	(.010)	(.051)	(.001)	(-.001)	(.001)	(.130)	(.000)	(.001)	(.002)	(.001)	
	.000	-.013	.076*	-.001	.033	.010	.019	.077	.013	.061*	.065*	-.042	.023	.164*	.025	.072*	.058	.023	.164

*Coefficient greater than or equal to 1.96 times its standard error; standardized and raw (in parentheses) coefficients.

**See Table 2 for variable abbreviations.

Table 5. Estimates of Bias in Curriculum Effect Parameters Due to Omission of Pre-Enrollment Controls (N=1607)

Coefficient for Curriculum Enrollment**	Dependent Variables									
	ACHV-11	PRPL-11	FAEN-11	MOEN-11	EDEX-SR	APPLIED	ADMITED	P/SAT-V	P/SAT-M	SRRANK
A. Total Effects of Curriculum, NO Pre-Enrollment Controls	.1764	.2662	.2790	.3123	.4411	.3346	.2461	.1091	.2129	.0819
B. Total Effects of Curriculum WITH Pre-Enrollment Controls	.1264	.1739	.1808	.2104	.3595	.2561	.1943	.0680*	.1774	.0554*
C. Total Effects Bias	39.6%	53.1%	54.3%	48.4%	22.7%	30.7%	26.7%	-----	20.0%	-----
D. Structural Effect of Curriculum, NO Pre-Enrollment Controls					.3474	.2505	.1818	.0047*	.1398	.0110*
E. Structural Effect of Curriculum WITH Pre-Enrollment Controls					.3063	.2114	.1636	.0089*	.1283	.0094*
F. Structural Effects Bias					13.4%	18.5%	11.1%	-----	9.0%	-----
Structural R^2										
NO Controls	.7108	.2480	.1207	.1528	.3724	.3143	.1553	.6955	.6347	.1875
WITH Controls	.7905	.3310	.2604	.2879	.3992	.3388	.1642	.7095	.6404	.1894

*Not significantly different from zero at $\alpha \leq .05$.

**Standardized coefficients reported.

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